CLAIMS:

1. An optical information storage medium (1) comprising:

- a carrier substrate (5),

- a reflective information layer (10) being positioned on the carrier substrate (5) and comprising at least a first layer (11) of a first inorganic material in a first structural phase, and at least a second layer (12) of at least a second inorganic material in at least a second structural phase,

- alloy inclusions (6) being formed in the information layer (10) upon exposure to a first electromagnetic radiation and having a microstructure comprising a mixture of the first material in the first structural phase and the at least second material in the at least second structural phase,

wherein the optical properties of the alloy inclusions are different from the optical properties of the as-deposited information layer so that a modulation in electromagnetic radiation reflected from the alloy inclusions and from an area comprising the as-deposited information layer, respectively, is provided in response to a second electromagnetic radiation being emitted towards the optical information storage medium (1) to provide a read-out signal.

2. A medium according to claim 1, wherein the inorganic materials at least comprises materials being selected from the group consisting of the pairs: As-Pb, Bi-Cd, Bi-Co, Bi-In, Bi-Pb, Bi-Sn, Bi-Zn, Cd-In, Cd-Pb, Cd-Sb, Cd-Sn, Cd-Ti, Cd-Zn, Ga-In, Ga-Mg, Ga-Sn, Ga-Zn, In-Sn, In-Zn, Mg-Pb, Mg-Sn, Mg-Ti, Pb-Pd, Pb-Pt, Pb-Sb, Sb-Sn, Sb-Ti, Se-Ti, Sn-Ti, and Sn-Zn.

3. A medium according to claim 1 or 2, wherein the inorganic materials at least comprises materials being selected from the group consisting of the pairs: Bi-Co, Bi-In, Bi-Pb, Bi-Sn, Bi-Zn, Ga-In, Ga-Sn, In-Sn, In-Zn, Mg-Sn, Sb-Sn, Sn-Ti, and Sn-Zn.

4. A medium according to any of the preceding claims, wherein the inorganic materials at least comprises the combination of Bi-In, Bi-Sn, In-Sn.

5. A medium according to any of the preceding claims, wherein each inorganic material has a complex refractive index $n \pm ik$ and wherein the second inorganic material is selected to have a real part of the refractive index lower than the real part of the refractive index of the first material and an imaginary part of the refractive index higher than the imaginary part of the refractive index of the first material.

6. A medium according to any of the preceding claims wherein the first inorganic material forming the first layer (11) is Bi and the second inorganic material forming the second layer (12) is In or Sn, or wherein the first inorganic material is Sn and the second inorganic material is In.

7. A medium according to any of the preceding claims, wherein the thickness of the first and second layers (11, 12) are selected so that an alloy formed by melting and solidifying of at least a part of the first and second layers has a substantially eutectic composition.

8. A medium according to any of the preceding claims, further comprising at least one additional layer (4) positioned between the carrier substrate and the at least first layer (11).

9. A medium according to claim 8, wherein the alloy (6) or the as-deposited information layer (10) are substantially transparent to the second electromagnetic radiation emitted towards the medium.

10. A medium according to claim 9, wherein the at least one additional layer (4) is adapted to reflect, absorb or diffuse the second electromagnetic radiation being emitted towards the additional layer.

11. A medium according to any of claim 8-10, wherein the at least one additional layer (4) comprises at least one sub-layer comprising a dielectric material.

12. A medium according to any of claims 8-11, wherein the at least one additional layer (4) comprises at least one sub-layer comprising a metal.

13. A medium according to any of claims 8-12, wherein the at least one additional layer (4) comprises at least one transparent spacer layer.

14. A medium according to claim 1, wherein the medium further comprises a protective cover layer (3).

15. A medium according to any of the preceding claims, wherein the modulation in reflected electromagnetic radiation between an area comprising the alloy and an area comprising the as-deposited layer is larger than 70%.

16. A medium according to any of the preceding claims, wherein the modulation is an intensity modulation or a phase modulation.

17. A medium according to any of the preceding claims wherein the medium is compatible with CD and DVD standards.

18. The use of a medium according to any of claims 1-17 in an optical information reading and/or recording device.

19. An optical storage information medium comprising:

- a carrier substrate (5),
- a first recording stack comprising
  - a reflective information layer (10) comprising at least a first layer (11) of a first inorganic material in a first structural phase, and at least a second layer (12) of at least a second inorganic material in at least a second structural phase,
  - alloy inclusions (6) being formed in the information layer (10) and having a microstructure comprising a mixture of the first material in the first structural phase and the at least second material in the at least second structural phase,
- a separation layer,
- a second recording stack substantial identical to the first recording stack.

20. A method for manufacturing an optical information storage medium (1), the method comprising the steps of:

- providing a carrier substrate (5),
- providing a reflective information layer (10) by depositing at least a first layer (11) of a first inorganic material in a first structural phase on the carrier substrate, and depositing at least a second layer (12) of at least a second inorganic material in a second structural phase on the first layer,
- the at least first and second inorganic materials being selected so that a microstructure being formed by melting and solidification of at least a part of the information layer provides alloy inclusions (6) having a microstructure comprising a mixture of the first material in the first structural phase and the second material in the second structural phase.

21. A method according to claim 20, further comprising the step of exposing in a predetermined pattern the information layer to a first electromagnetic radiation so as to form alloy inclusions in the exposed information layer.

22. An optical information storage medium being provided by the method of claims 20-21.

23. A method for optically reading an optical information storage medium according to any of claims 1-17, the method comprising the steps of:

- emitting an electromagnetic radiation towards the optical information storage medium,
- detecting a phase or intensity modulation in electromagnetic radiation reflected from the optical information storage medium in response to the incoming electromagnetic radiation,

so that a pattern of alloy inclusions in the as-deposited information layer is provided by the detected phase or intensity modulation.